MARKET PERCEPTIONS OF EFFICIENCY AND NEWS IN ANALYST FORECAST ERRORS

A Dissertation

by

GIA MARIE CHEVIS

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

August 2003

Major Subject: Accounting

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ABSTRACT

Market Perceptions of Efficiency and News in Analyst Forecast Errors. (August 2003)

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Financial analysts are considered inefficient when they do not fully incorporate relevant information into their forecasts. In this dissertation, I investigate differences in the observable efficiency of analysts' earnings forecasts between firms that consistently meet or exceed analysts' earnings expectations and those that do not. I then analyze the extent to which the market incorporates this (in)efficiency into its earnings expectations. Consistent with my hypotheses, I find that analysts are relatively less efficient with respect to prior returns for firms that do not consistently meet expectations than for firms that do follow such a strategy, especially when prior returns convey bad news. However, forecast errors for firms that consistently meet expectations do not appear to be serially correlated to a greater extent than those for firms that do not consistently meet expectations. It is not clear whether the market considers such inefficiency when setting its own expectations. While the evidence suggests they may do so in the context of a shorter historical pattern of realized forecast errors, other evidence suggests they may not distinguish between predictable and surprise components of forecast error when the historical forecast error pattern is more established.

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INTRODUCTION

> [T]he earnings game does actual harm. It distorts corporate decision making. It reduces securities analysis and investing to a guessing contest. It compromises the integrity of corporate audits. Ultimately, it undermines the capital markets.
>
> -Collingwood (2001)

Financial analysts' forecasts are an important earnings target for firms and consequently are a focus of time and attention for market participants. Managers have a variety of incentives to meet or exceed these expectations. At the same time, investors have an incentive to improve upon analysts' forecasts by incurring additional information search costs if they believe that the forecasts are not fully informative. For example, analysts are considered inefficient when they do not fully incorporate relevant information into their forecasts; that is, they are inefficient when they do not get to the "right" prediction because they systematically do not search for or use relevant information "enough" and/or use any information gathered incorrectly.[1] Prior empirical work has found evidence consistent with analyst inefficiency. Investors may, however, rely more on forecasts that appear more efficient.

In this paper, I investigate whether a firm's strategy of consistently meeting or exceeding expectations influences observable forecast efficiency. Such a strategy may reduce the variability in ex-post forecast errors and so may make analysts' forecasts appear efficient, regardless of the actual behavior of analysts. I then analyze the extent to which the market incorporates this (in)efficiency into its earnings expectation by

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This dissertation follows the style of the Journal of Accounting and Economics.

[1] Givoly (1985) cites Muth's (1961) criterion for rationality, namely that for a forecast to be rational its formation must follow the same stochastic process that generates the forecasted variable. He states, however, that most tests of this tenet are much narrower in scope, that they are tests for unbiasedness and efficiency. I discuss this definition of efficiency in further detail in Section 2.

examining whether the resultant forecast predictability affects the market's reaction to the announcement of realized earnings. To the extent that analyst forecasts are naively incorporated into market expectations, inefficient forecasts contribute to market inefficiencies.

Addressing these issues will increase our understanding of how earnings games affect market participants' abilities to evaluate firm performance. Managers play an "earnings game" when they focus on the quarterly earnings number (and its relation to the consensus forecast) to the exclusion of nearly all else (Collingwood [2001]). Critics cite these games as causes for concern, diverting managers' time from real, productive effort and concentrating their efforts on meeting a short-run, benchmark figure. Recent events, such as the scandals with analysts at investment banks, underscore the importance of understanding how and to what extent analysts' and investors' misinterpretation of earnings strategies contributes to a harmful playing field for market participants. Additionally, addressing these questions may help identify the situations in which market participants are the most disadvantaged and inform debate as to what institutional remedies may be required.

Indeed, government regulators have recently turned their attention to this issue. Federal Reserve Chairman Alan Greenspan points out that the current environment of rapid change makes long-term forecasting riskier and, consequently, has led to a focus on short-term earnings when assessing the investment value of equity securities. This short-term focus has, in turn, shifted CEO attention to "accounting devices" useful in meeting that target,[2] compromising the transparency and comparability of reported accounting numbers (Levitt [1998]). The United States Congress' recent passage of the Sarbanes-Oxley Act is coincident with President Bush's condemnation of both "deception accounting" and analysts' positions as "salesmen with a hidden agenda."[3] While critics believe the managerial focus on quarterly earnings forecasts to be inappropriate, to date little systematic work assesses the implications of consistently meeting or exceeding analyst forecasts.

Existing papers concentrate either on the characteristics of firms that meet or beat analysts' forecasts (Chevis, Das, and Sivaramakrishnan [2002a]; Matsumoto [2002]) or on the rewards to such behavior (Lopez and Rees [2002]; Bartov, Givoly, and Hayn [2002]; Kasznik and McNichols [2002]; Chevis, Das, and Sivaramakrishnan [2002b]). My paper contributes to this literature by investigating differences in the observability of analyst forecast efficiency within the context of the meet-or-beat strategy and whether these differences influence the market's perception of news in the forecast error. It is a step toward understanding the impact on the market of firms consistently meeting or exceeding analysts' forecasts of quarterly earnings, rather than an investigation of the strategy per se.

In the first part of the analysis, I model forecast errors as a function of publicly-available information, proxied by prior returns and forecast errors, similar to Elgers and Lo (1994). I compare the resulting slope estimates for firms that consistently meet or exceed analyst expectations to those that do not in order to examine the effects of such

[2] Remarks at the Stern School of Business, New York University, March 26, 2002.
[3] Speech in New York, July 9, 2002.

behavior on observable analyst forecast efficiency. In the second part, I investigate the relation between this (in)efficiency and the market's response to realized earnings. In particular, I calculate the residual forecast error after controlling for analyst inefficiency and examine the differences in earnings response coefficients for the residual and predictable components of error.

Consistent with my hypotheses, I find that analysts appear relatively inefficient with respect to prior returns for firms that *do not* consistently follow a strategy of meeting or exceeding analyst earnings forecasts, especially when those returns convey bad news. However, analysts appear relatively inefficient with respect to the information in prior period forecast errors for firms that *do* consistently meet or beat expectations. It is not clear whether the market is able to discern this inefficiency, however. While the evidence suggests they may do so in the context of a shorter historical pattern of realized forecast errors, other evidence suggests they may not distinguish between predictable and surprise components of forecast error when the historical forecast error pattern is more established.

EFFICIENCY OF ANALYST EARNINGS FORECASTS CONDITIONAL ON AN EARNINGS STRATEGY

Introduction

As indicated above, analysts are inefficient when they do not fully incorporate relevant information into their forecasts (Givoly [1985]); that is, analysts do not get to the "right" prediction because they systematically do not search for or use relevant information "enough" and/or use any information gathered incorrectly.

Several studies examine analyst forecast efficiency by using various proxies for "relevant information." Though forecast revisions are positively associated with contemporaneous returns (Imhoff and Lobo [1984]), analysts still do not incorporate all of the information available in prices (Lys and Sohn [1990]; Abarbanell [1991]). Consistent with these results, Elgers and Lo (1994) find that using information from prior period returns and earnings to adjust current period analyst forecasts can substantially improve forecast accuracy. Several other studies find that time-series-based and analyst-based earnings forecasts are complementary; a more accurate forecast can be created by using elements of both (Conroy and Harris [1987]; Lobo and Nair [1991]; Elgers and Murray [1992]).

These studies suggest that analysts are to some degree inefficient in their forecast formation. Using these prior works as a starting point, I first describe the relation between forecast errors and certain information variables. I then describe how a firm's use of a strategy of consistently meeting or exceeding expectations can affect these relations.

Efficiency and returns

Consistent with the above papers, and assuming returns during the period reflect, at least in part, information relevant for earnings reported at the end of the period, I expect to observe a relationship between realized forecast errors and contemporaneous returns if analysts are inefficient.

$$FE_{it} = \alpha + \beta R_{it} + \varepsilon_{it} \quad (1)$$

where

FE_{it}	=	realized forecast error for firm i period t, defined as actual less forecasted earnings, deflated by price measured two days after the earnings announcement for period t-1,
R_{it}	=	return for firm i period t, measured from two days after the earnings announcement for period t-1 through the day prior to the forecast date, and
ε_{it}	=	residual term.

In this model, the intercept estimate α includes any forecast bias, while the slope estimate β is a measure of the degree of forecast inefficiency relative to the return variable. That is, since β is the correlation between returns and realized forecast error, it is a measure of the extent to which the information in returns is not reflected in forecasts. If forecasts correctly incorporated all of the information in returns, there would be no systematic relation between that information and the extent to which analysts were wrong (i.e. forecast errors would be a random shock).

It is not immediately clear whether any observable correlation would be positive or negative, however. Overreaction to information is indicative of an over-extrapolation of current results into the future. If analysts tend to overreact to information, as DeBondt and Thaler (1990) suggest, then in periods of good (bad) news they will tend to post forecasts of earnings that turn out to be too high (low). The observed forecast error will then be optimistic (pessimistic), and the correlation between forecast errors and pre-earnings announcement returns will be negative, e.g. the pre-earnings announcement information is positive but the forecast error is negative.[4] Conversely, underreaction implies that the full import of current results for the future is not understood. If analysts tend to underreact to information, as Mendenhall (1991) and Abarbanell and Bernard (1992) suggest, the reverse argument will hold. That is, in periods of good (bad) news their earnings estimates will be too low (high), resulting in an observed pessimistic (optimistic) forecast error and a positive correlation between errors and returns. Figure 1 below illustrates these relationships.

Of course, analysts may not react the same way to both good and bad news. If they overreact to good news but underreact to bad news, as in Easterwood and Nutt (1999), then the correlation between errors and returns will be negative when the return is negative but positive when the return is positive. If they underreact to good news and overreact to bad news, the reverse will hold. To accommodate this possibility, I calculate individual intercepts and slopes for negative and nonnegative return firms.[5]

$$FE_{it} = \alpha_1 UP_{it} + \alpha_2 DN_{it} + \beta_1 Rit^*UP_{it} + \beta_2 Rit^*DN_{it} + \varepsilon_{it} \qquad (2)$$

where

$UP=1$ if $R_{it} \geq 0$ and 0 otherwise, and

$DN=1$ if $R_{it} < 0$ and 0 otherwise.

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[4] To find a correlation, the information and the errors must be related in magnitude and not just sign. For example, if analysts overreact to high good news, the resulting error should be larger than if they overreact to low good news. To the extent that this extrapolation is non-constant, it biases against finding results.

[5] This specification is equivalent to stacking separate regressions of equation (1) for good news and bad news firms.

	Good News	Bad News
Overreaction	$R > 0$ F too high $A - F < 0$ $\rho < 0$	$R < 0$ F too low $A - F > 0$ $\rho < 0$
Underreaction	$R > 0$ F too low $A - F > 0$ $\rho > 0$	$R < 0$ F too high $A - F < 0$ $\rho > 0$

Notes:
Variable definitions:
A Actual earnings for firm *i,* period *t*
F Forecasted earnings for firm *i,* period *t*
R Return for firm *i,* period *t*, measured from *t*-1 earnings announcement through the forecast

Figure 1
Interpretation of β_1 and β_2 signs

Again, the coefficients α_1 and α_2 encompass any forecast bias for firms with good and bad news during the period, respectively. The slope coefficients indicate the extent of analyst under/overreaction to the information in returns. Specifically, β_1 is the relationship between forecast errors and returns for positive return firms, while β_2 is the relationship for negative return firms. Given the conflicting evidence of prior papers, I do not make predictions about the signs of the estimated coefficients.

Efficiency and past errors

In addition to the news reflected in current period returns, analysts should take forecast error history into account when forming their expectations for the current period's earnings (Givoly 1985).[6] As with the returns-based information, if analysts are efficient with respect to their prior forecast errors, then there should be no correlation between errors in successive periods; there should be neither a persistent error (positive serial correlation) nor a predictable switch between over and underestimation of earnings (negative serial correlation). Including this information, the model becomes:

$$FE_{it} = \alpha_1 UP_{it} + \alpha_2 DN_{it} + \beta_1 Rit{*}UP_{it} + \beta_2 Rit{*}DN_{it} + \beta_3 FE_{it-1} + \varepsilon_{it} \qquad (3)$$

Brown and Rozeff (1979) find that analysts appear to adaptively correct their future earnings expectations; that is, they raise (lower) their consensus forecast of subsequent earnings when they've underestimated (overestimated) earnings for the current period. This is consistent with the null hypothesis of $\beta_3 = 0$; since analysts learn from past mistakes, consecutive forecasts are not systematically related. Ali, Klein, and Rosenfeld (1992), however, find that consensus forecast errors are positively serially correlated when firms have more permanent earnings, suggesting that in at least some cases such adaptive corrections are not complete, consistent with a finding of $\beta_3 > 0$. Additionally, if firms consistently meet or exceed expectations, forecast errors should be positively serially correlated.[7]

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[6] Givoly (1985) specifically refers to individual analysts. I use consensus forecasts, but the same logic still applies. That is, if each analyst that forms the consensus takes their own forecast error history into account, the consensus, too, should reflect that efficiency.

[7] For example, a firm that consistently exceeds expectations by a penny would have perfect serial correlation in forecast errors ($\beta_3 = 1$).

The effect of an earnings strategy on observable analyst efficiency

Analysts, however, are not the only market participants that affect the magnitude and sign of the realized forecast error. Managers ultimately post the earnings realization, and two methods are available to them in their pursuit of the forecast: expectations management and earnings management. The former requires managers to guide analyst forecasts toward a more preferable target. The latter requires managers to use available flexibility in discretionary accruals.

Despite their shortcomings, forecasts remain an important performance hurdle for firms. Several studies document that a firm receives a reward when it meets or exceeds expectations, over both a short (Kasznik and McNichols [2002]; Lopez and Rees [2002]; Bartov, Givoly, and Hayn [2002]) and long window (Chevis, Das, and Sivaramakrishnan [2002b]). Skinner and Sloan (2002) show that some firms face an asymmetric return structure to realized forecast errors;[8] though small positive errors generate small positive reactions, small negative errors generate much larger negative reactions. Additionally, empirical evidence exists showing that the market regards analyst forecasts as possessing information content. For example, Cornell and Landsman (1989) show that at the time of a quarterly earnings announcement, the market not only reacts to this period's earnings information but also to the revision by analysts of their forecasts for the following period.

[8] Skinner and Sloan (1999) focus specifically on growth firms, but it seems reasonable, especially given the press attention to quarterly earnings announcements, that non-growth firms would face the same asymmetric reward structure. Lopez and Rees (2002) report results consistent with this notion for their full sample of firms, which includes growth and nongrowth firms.

All managers, even those with bad news (negative returns) during the period or forecasted losses, can have an incentive to meet or exceed earnings forecasts[9]. They may attempt to do so throughout the period through expectations management and, if still necessary, at the end of the period through earnings management[10]. There is no need to consistently generate extreme positive errors, however. Exactly meeting or exceeding expectations by only a small amount allows the firm to meet the earnings target but it neither "wastes" credibility or slack in accruals which may be needed for future periods nor encourages the next quarter's forecast to start out too high.

These incentives may combine to restrict the observed variability in forecast errors for firms that *consistently* meet or exceed expectations (MEET firms). As a result, the observed correlation between forecast errors and contemporaneous returns may be weakened for MEET firms, *regardless of the actual level of analyst efficiency*. That is, analysts of firms that consistently meet or beat forecasts *appear* more efficient with respect to returns information, while the real reason for the lack of observable correlation may be the strategizing efforts of management. For firms that do not (successfully) follow such a strategy, the market can better observe the actual efficiency of analysts with respect to returns. MEET firms may, however, still have a stronger

[9] To my knowledge, there is no research on whether target preferences are different for positive and negative return firms. Degeorge, Patel, and Zeckhauser (1999) imply that there is an order to the preference: first, positive income; second, positive change in income; third, positive forecast error. Other work has used this notion; for example, Brown (1998) maintains that firms are of the "miss by an inch, miss by a mile" mindset, i.e. that firms which are going to post losses do not have a motivation to beat expectations. Given the potential for managers to manage *expectations*, as well as earnings, I do not believe the hierarchy necessarily holds; it does not speak to the question of whether managers' incentives to consistently meet or exceed expectations are different for profit and loss firms.

[10] This refers to an *order* of actions, not a *preference* for a particular action. For example, evidence in Chevis, Das, and Sivaramakrishnan (2002b) suggests that earnings management is employed more frequently than expectations management in order to consistently meet or exceed expectations.

positive serial correlation in the observed forecast errors than firms that do not consistently meet or beat expectations (NONMEET firms). While MEET firms may appear ex-post to be relatively *more* efficient with respect to current period information (returns), they may appear to be relatively *less* efficient with respect to prior period forecast errors. The resulting hypotheses follow:

$$H1A: \left|\beta_{1,MEET}\right| < \left|\beta_{1,NONMEET}\right|$$
$$H1B: \left|\beta_{2,MEET}\right| < \left|\beta_{2,NONMEET}\right|$$
$$H2: \quad \left|\beta_{3,MEET}\right| = \left|\beta_{3,NONMEET}\right|$$

Data sources and variable measurement

I obtain information on analyst forecasts and actual earnings from the I/B/E/S Detail File from the first quarter of 1996 through the first quarter of 2001. The detail, rather than the summary, file is used in order to obtain a cleaner window[11] over which to estimate the return-information proxy. Additionally, it allows more control over the staleness of the forecasts included in the consensus estimate. Analyst forecast error (FE) is calculated as actual less forecasted earnings per share, deflated by the price at the beginning of the return accumulation window (i.e. two days after the t-1 earnings announcement). Both a consensus and the single-most-recent forecast are used in the tests. A consensus forecast better represents an earnings target as it is the one typically reported in the popular press. The recency of the single most recent forecast (relative to the earnings announcement), however, gives analysts their best chance to incorporate all relevant information. The consensus forecast value is measured as the median of the

[11] An alternative source of consensus forecast information is the IBES Consensus tape. For these consensus estimates, it is difficult to ascertain the date of the earliest individual forecast contained in the consensus estimate.

forecasts made within the sixty day period prior to the earnings announcement, while the single most recent forecast is the last available forecast in that same period. Actual earnings are also obtained from I/B/E/S to improve the alignment between actual and forecasted earnings.

Return information is obtained from the CRSP tapes. Information-proxy returns (R_{it}) are market-adjusted cumulative abnormal returns (raw return less the value-weighted market return). Because the information must be available prior to the forecast, these pre-announcement window returns are measured from two days after the previous quarter's earnings announcement through the date of the first forecast used in calculating the consensus (single most recent forecast).

Similar to Chevis, Das, and Sivaramakrishnan (2002b), I classify firms according to how many times they meet or exceed expectations during the horizon. MEET firms are those which meet or exceed analyst expectations in each of the eight prior quarters, up to and including the current quarter; these firms have demonstrated a strategy of consistently meeting or exceeding expectations. A NONMEET firm is one in which forecasts were met or exceeded no more than half the time (i.e. in fewer than five of the eight quarters); these firms do not appear to have such a strategy, and may, in fact, have a pattern of consistently *missing* analyst expectations. Additionally, a screen is run to ensure any quarters in which a NONMEET firms meets or exceeds expectations are not concentrated in the latter half of the horizon window, as this may indicate a change in strategy. Firms which are not classified as MEET or NONMEET are not included in the analysis. This two-year measurement window represents a compromise between evidence of an established strategy and sample size considerations. As a sensitivity check, however, tests are replicated using both four- and twelve-quarter horizons. Similar to the eight-quarter horizon, firms are classified as MEET if they meet or exceed analyst expectations in each of the four (twelve) prior quarters, including the current quarter, and are classified as NONMEET if they meet or exceed expectations in two (six) or fewer quarters.

Several steps are taken to eliminate data errors and reduce the effect of outliers. First, to eliminate data errors, I eliminate firm quarters in which raw returns are less than -1. Next, to reduce the effect of outliers, I delete a firm-quarter if its beginning of period stock price is less than $3 per share in order to alleviate the unique effects of small-cap stocks. Then, I delete observations in which the absolute forecast error is in excess of 100% of the beginning of period stock price. Finally, I delete observations within each regression estimation with a studentized residual in excess of 3 in absolute value.

I estimate equation 3 two ways. First, I estimate equation 3 quarterly for each group separately (i.e. twenty-one quarterly estimations for MEET firms and twenty-one quarterly estimations for NONMEET firms). I then perform T-tests of the mean difference in absolute value of the coefficient estimates for each quarter. That is, I calculate $DIFF = \left|\hat{\beta}_{Q,MEET}\right| - \left|\hat{\beta}_{Q,NONMEET}\right|$ and perform a T-test of H0: DIFF=0 to determine if there is a significant difference within each quarter, on average, in the magnitude of the MEET and NONMEET coefficient estimates. Next, I estimate equation 3 jointly for the MEET and NONMEET groups by interacting each term with a dummy variable for MEET and NONMEET and running the resulting equation on the full sample. I then perform F-tests to determine if $\left|\hat{\beta}_{MEET}\right| - \left|\hat{\beta}_{NONMEET}\right|$ for a particular β estimate.

Results

Descriptive results for MEET and NONMEET groupings based on consensus forecast error are in Table 1. Panel A reports means, medians, and T-tests of differences in means for the forecast error and return variables used in later analysis, as well as several additional contextual items. On average, analysts slightly overestimate current period earnings for firms that do not have a pattern of consistently meeting or exceeding expectations (NONMEET firms) in the past. By sample construction, analysts slightly underestimate current period earnings for MEET firms. Though both MEET and NONMEET firms have approximately the same percentage of negative and nonnegative return observations, the value of both negative and nonnegative returns for MEET firms are significantly larger than those of NONMEET firms, indicating MEET firms have a broader returns distribution. MEET firms are, in general, larger and more profitable than NONMEET firms, though they do not appear to be any more highly levered. The return measurement window is slightly longer for NONMEET firms, indicating the first forecast used in creating the consensus typically occurs later in the quarter relative to the previous earnings announcement date for these firms. While the difference is significant, it is not large (an average of approximately two days) and should not affect the regression analyses.

Panel B reports both Pearson and Spearman correlation coefficients for the main regression variables. The univariate results are mixed for the hypothesis that analysts appear more efficient with respect to prior returns for MEET firms than for NONMEET firms (hypotheses 1a and 1b); current period forecast error is not consistently significantly correlated with prior returns for either group. For hypothesis 2, however—that forecast errors are more persistent for MEET firms than for NONMEET firms, the evidence is more clear. Both the Pearson and Spearman correlations between current and lagged forecast error appear to be larger for MEET firms than for NONMEET firms.

Table 2 presents the results of the quarterly analysis of equation (3) for all three horizons using consensus forecasts. Turning to panel A, results for the eight quarter horizon, note that the significance of the average coefficient estimate on returns-based news depends upon the nature of the news. The average coefficient for good news (positive returns) is marginally significantly greater than zero for MEET firms, suggesting that analysts may tend to underreact to good news in their forecasts of current period earnings if the firm has a past pattern of meeting or exceeding expectations. A similar result can be found in panels B and C for the four and twelve quarter horizons, respectively. These results are consistent with the earnings game notion that analysts have an incentive to "lowball" their forecasts and "allow" firms to post a good news earnings surprise. For NONMEET firms, it is the average coefficient estimate for bad news that is significantly greater than zero at the eight and four quarter horizons,

Table 1
Univariate Statistics
Eight-Quarter Horizon, Consensus Forecast

Panel A: Means and Medians

Mean[a] Median	MEET[b] n=3,340	NONMEET n=3,089	t-stat[c]
FE_{it}^{cons}	0.0009 0.0003	-0.0017 -0.0002	7.64
$FE_{it-1}^{cons.}$	0.0009 0.0003	-0.0023 -0.0003	10.47
UP_{it}	0.5066 1	0.4551 0	n/a
DN_{it}	0.4934 0	0.5449 1	n/a
$UP_{it}*R_{it}$	0.0546 0.0000	0.0451 0.0000	3.78
$DN_{it}*R_{it}$	-0.0546 0.0000	-0.0588 -0.0152	1.89
$Sales_{it}$	1,824 531	813 304	13.64
Compustat EPS_{it}	0.527 0.450	0.231 0.280	7.01
$Assets_{it}$	18,274 3,151	7,032 2,104	11.22
$Liabilities_{it}$	15,181 1,840	5,442 1,280	10.44
$Equity_{it}$	3,092 1,075	1,590 706	13.88
$Leverage_{it}$	3.281 1.393	3.116 1.711	0.42
Return Window	44.74 42	47.42 46	-5.90
Forecast Window	42.51 46	39.72 42	7.89

Table 1, Continued

Panel B—Correlation Coefficients

MEET

		Pearson			
		FE_{it}	FE_{it-1}	$UP_{it}*R_{it}$	$DN_{it}*R_{it}$
Spearman	FE_{it}	1.000	0.669***	0.022	-0.044**
	FE_{it-1}	0.520***	1.000	0.033*	-0.021
	$UP_{it}*R_{it}$	0.041**	0.016	1.000	0.325***
	$DN_{it}*R_{it}$	-0.003	-0.016	0.789***	1.000

NONMEET

		Pearson			
		FE_{it}	FE_{it-1}	$UP_{it}*R_{it}$	$DN_{it}*R_{it}$
Spearman	FE_{it}	1.000	0.138***	-0.010	0.025
	FE_{it-1}	0.153***	1.000	0.041**	-0.007
	$UP_{it}*R_{it}$	0.059***	0.053***	1.000	0.308***
	$DN_{it}*R_{it}$	0.086***	0.085***	0.771***	1.000

Notes:

[a]Variable definitions:

FE_{it}^{cons}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it}	Compound return for firm *i* period *t*, measured from two days after the prior quarter's earnings announcement through the day prior to the first forecast used to calculate the consensus earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it}	1 if $R_{it} \geq 0$, 0 otherwise.
DN_{it}	1 if $R_{it} < 0$, 0 otherwise.
Sales	Net sales for the quarter (I2)
EPS_{it}	Earnings per share for firm *i* period *t*, fully diluted and including extraordinary items (I7)
Assets	Total assets at the end of the quarter (I44)
Liabilities	Total liabilities at the end of the quarter (I54)
Equity	Total assets less total liabilities at the end of the quarter (I44-I54)
Leverage	Ratio of total liabilities to total equity at the end of the quarter
Return Window	Number of days over which R_{it} is measured
Forecast Window	Number of days over which the consensus forecast, FE_{it}^{cons}, is calculated

[b]Firms are categorized by how many times they meet within the most recent eight, four, and twelve quarters, including the current quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters. The precise number of observations depends on data availability and varies by item.

[c]T-statistics (difference in means test) are reported comparing the MEET and NONMEET subsamples.

suggesting that analysts underreact to bad news when the firm has not consistently met or exceeded expectations in the past. This result is consistent with prior findings of analyst optimism.

T-tests of the mean difference in absolute coefficient estimates for β_1 and β_2 are consistent with hypotheses 1A and 1B, which posited that the magnitude of the relationship between news and forecast error (i.e. the degree of analyst forecast inefficiency) would be greater, on average, for NONMEET firms than for MEET firms. For example, the estimate for β_1 is, across quarters, not significant for NONMEET firms, implying that analysts do not consistently over or underestimate the impact of good news for current period earnings. *Within* a quarter, however, the magnitude of analyst inefficiency is on average larger for NONMEET firms than for MEET firms. Within a quarter, β_2 is also larger in magnitude, on average, for NONMEET firms. This result holds for each horizon.

The average estimated coefficient on lagged forecast errors, β_3, is significantly positive for both MEET and NONMEET firms, suggesting analysts consistently underreact to their prior period errors. Consistent with hypothesis 2, the estimated magnitude of β_3 is, on average, larger for MEET firms than for NONMEET firms at each horizon.

Table 2
Quarterly Regression Results on Observable Analyst Efficiency Using Consensus Analyst Estimates of Earnings

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$FE_{it} = \alpha_1 UP_{it} + \alpha_2 DN_{it} + \beta_1 Rit{*}UP_{it} + \beta_2 Rit{*}DN_{it} + \beta_3 FE_{it-1} + \varepsilon_{it}$

Panel A: Eight-quarter horizon

	MEET[b,c]	NONMEET	T-test[d] $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0002 (5.55)	-0.0003 (-1.15)	-3.48***
DN	0.0003 (5.64)	-0.0005 (-2.04)	-4.20***
R*UP	0.0005 (1.73)	-0.0023 (-0.65)	-2.70**
R*DN	0.0000 (0.10)	0.0087 (2.19)	-3.70***
FE_{t-1}	0.5546 (12.69)	0.2050 (3.64)	4.53***

Panel B: Four-quarter horizon

	MEET	NONMEET	T-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0004 (10.44)	-0.0010 (-5.55)	4.61***
DN	0.0005 (8.15)	-0.0007 (-2.76)	3.63***
R*UP	0.0007 (3.00)	0.0015 (0.91)	4.24***
R*DN	0.0000 (0.12)	0.0072 (3.63)	4.91***
FE_{t-1}	0.4926 (14.50)	0.1668 (2.49)	3.71***

Table 2, Continued

Panel C: Twelve-quarter horizon

	MEET	NONMEET	T-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0002	-0.0006	3.76***
	(1.74)	(-1.76)	
DN	0.0002	-0.0007	3.82***
	(3.55)	(-1.59)	
R*UP	0.0012	0.0000	4.01***
	(1.82)	(0.04)	
R*DN	0.0008	0.0080	3.44***
	(0.81)	(1.35)	
FE_{t-1}	0.6279	0.1469	3.10***
	(5.13)	(2.31)	

Notes:

[a]Variable definitions:

FE_{it}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it}	Return for firm *i* period *t*, measured from two days after the prior quarter's earnings announcement through the day prior to the first forecast used to calculate the consensus earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it}	1 if $R_{it} \geq 0$, 0 otherwise
DN_{it}	1 if $R_{it} < 0$, 0 otherwise.

[b]Firms are categorized by how many times they meet within the most recent eight, four, and twelve quarters, including the current quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient are reported as the average estimate over 21 cross-sectional quarterly regressions performed for each group, MEET and NONMEET.

[d]T-tests are reported evaluating the mean difference in absolute value of coefficients.

Results for estimation of equation 3 jointly for MEET and NONMEET firms are presented in Table 3. These results are generally consistent with those found in Table 2, with the exception of the relationship between forecast errors and good news. Here, analysts appear relatively efficient with respect to good news for both MEET and NONMEET firms, both across quarters within a group as well as across groups within a quarter.

Table 3
Pooled Regression Results on Observable Analyst Efficiency Using Consensus Analyst Estimates of Earnings

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$FE_{it} = \alpha_1 UP_{it} + \alpha_2 DN_{it} + \beta_1 Rit{*}UP_{it} + \beta_2 Rit{*}DN_{it} + \beta_3 FE_{it-1} + \varepsilon_{it}$

Panel A: Eight-quarter horizon

	MEET[b,c]	NONMEET	F-test[d] $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0002	-0.0005	1.74
	(1.10)	(-2.97)	
DN	0.0001	-0.0004	0.79
	(0.72)	(-2.17)	
R*UP	0.0002	-0.0000	0.01
	(0.22)	(-0.06)	
R*DN	-0.0008	0.0077	16.30***
	(-0.63)	(6.75)	
FE_{t-1}	0.7744	0.0987	354.46***
	(22.21)	(11.57)	
		N=6,373	
		Adj. R^2 = 13.14%	

Table 3, Continued

Panel B: Four-quarter horizon

	MEET	NONMEET	F-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0005	-0.0009	7.26***
	(6.40)	(-8.94)	
DN	0.0005	-0.0008	3.88**
	(5.19)	(-7.35)	
R*UP	0.0006	0.0003	0.16
	(1.33)	(0.58)	
R*DN	-0.0011	0.0068	37.74***
	(-1.66)	(9.80)	
FE_{t-1}	0.4729	0.1004	527.02***
	(31.15)	(17.50)	
		N=15,902	
		Adj. R^2 = 15.07%	

Panel C: Twelve-quarter horizon

	MEET	NONMEET	F-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0000	-0.0011	13.58***
	(0.01)	(-5.80)	
DN	0.0000	-0.0009	5.99***
	(0.10)	(-4.24)	
R*UP	0.0014	0.0025	0.28
	(0.84)	(1.85)	
R*DN	0.0000	0.0084	10.40***
	(0.02)	(5.44)	
FE_{t-1}	0.8885	0.0642	334.93***
	(19.98)	(9.05)	
		N=3,148	
		Adj. R^2 = 19.32%	

Notes:

[a]Variable definitions:

FE_{it}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it}	Return for firm *i* period *t*, measured from two days after the prior quarter's earnings announcement through the day prior to the first forecast used to calculate the consensus earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it}	1 if $R_{it} \geq 0$, 0 otherwise
DN_{it}	1 if $R_{it} < 0$, 0 otherwise.

[b]Firms are categorized by how many times they meet within the most recent eight, four, and twelve quarters, including the current quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient estimates are reported for the regression estimated jointly for the MEET and NONMEET groups.

[d]F-tests are reported comparing the absolute value of the coefficient estimates between MEET and NONMEET groups.

Recall that the single most recent forecast is more timely than the consensus forecast (though typically not quoted in the popular press when earnings are announced). Consequently, by the time of the single most recent forecast, analysts have had more time to properly evaluate and incorporate the information they have obtained. Additionally, managers have had more time over which to provide earnings guidance to analysts and potentially influence the “earnings hurdle” they face. Tables 4 and 5 present the quarterly and jointly estimated coefficients, respectively, for equation 3 using the single most recent analyst forecast available prior to the earnings announcement as the measure of expected earnings in calculating current and lagged forecast error as well as MEET or NONMEET status.

Turning first to Table 4, containing coefficients estimated separately for each group and averaged across the twenty-one quarters, we see that the results are less clear. Consistent with the hypotheses, the T-tests of mean difference in absolute coefficient estimates at each horizon indicate that, within quarters, observable analyst inefficiency is on average greater for NONMEET firms than for MEET firms with respect to prior returns-based information but that forecast errors are more persistent for MEET firms. However, average coefficient estimates across quarters for a particular subgroup do not show a consistent pattern. At the four and eight quarter horizons analysts continue to underestimate the effect of bad news for NONMEET firms; however this effect is no longer evident by the twelve quarter horizon. Four quarter horizon results are consistent with the results obtained from Table 2; while the effects of bad news are underestimated for NONMEET firms, the effects of good news are underestimated for MEET firms.

However, at the longer horizons—when firms have consistently met or exceeded expectations for longer periods of time—current period forecasts appear efficient with respect to good news but appear to underestimate the effect of bad news. This is inconsistent with the notion of managers successfully issuing negative guidance in order to lower earnings expectations and hence their earnings hurdle.

However, results from Table 5 are consistent with results from Table 3. When the coefficients are estimated jointly, analysts appear efficient with respect to all returns-based news for MEET firms and relatively less efficient with respect to negative returns-based news for NONMEET firms. In addition, at the longer twelve-quarter horizon, analysts appear optimistic in general for NONMEET firms, overestimating the effect of good news and underestimating the effect of bad news for current period earnings.

Table 4
Quarterly Regression Results on Observable Analyst Efficiency Using the Single Most Recent Analyst Estimate of Earnings

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$FE_{it} = \alpha_1 UP_{it} + \alpha_2 DN_{it} + \beta_1 Rit^*UP_{it} + \beta_2 Rit^*DN_{it} + \beta_3 FE_{it-1} + \varepsilon_{it}$

Panel A: Eight-quarter horizon

	MEET[b,c]	NONMEET	T-test[d] $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0004	-0.0004	3.11***
	(6.14)	(-0.95)	
DN	0.0004	0.0002	3.17***
	(6.33)	(0.64)	
R*UP	0.0000	-0.0000	2.80**
	(0.38)	(-0.03)	
R*DN	0.0005	0.0094	3.07***
	(2.09)	(2.62)	
FE_{t-1}	0.4964	0.2403	2.55**
	(8.92)	(3.34)	

Table 4, Continued

Panel B: Four-quarter horizonn

	MEET	NONMEET	T-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0005	-0.0009	4.49***
	(10.75)	(-4.95)	
DN	0.0006	-0.0004	2.08**
	(9.69)	(-1.25)	
R*UP	0.0004	-0.0004	3.38***
	(2.59)	(-0.30)	
R*DN	0.0003	0.0072	3.88***
	(1.43)	(3.59)	
FE_{t-1}	0.4136	0.1639	2.65**
	(13.15)	(2.27)	

Panel C: Twelve-quarter horizon

	MEET	NONMEET	T-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0002	-0.0006	4.00***
	(3.70)	(-2.08)	
DN	0.0001	-0.0006	2.35**
	(1.11)	(-2.36)	
R*UP	0.0006	-0.0037	4.00***
	(1.51)	(-1.34)	
R*DN	-0.0013	0.0023	4.64***
	(-2.43)	(1.14)	
FE_{t-1}	0.7147	0.0894	2.71**
	(4.37)	(1.18)	

Notes:

[a]Variable definitions:

FE_{it}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it}	Return for firm *i* period *t*, measured from two days after the prior quarter's earnings announcement through the day prior to the first forecast used to calculate the consensus earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it}	1 if $R_{it} \geq 0$, 0 otherwise
DN_{it}	1 if $R_{it} < 0$, 0 otherwise.

[b]Firms are categorized by how many times they meet within the most recent eight, four, and twelve quarters, including the current quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient are reported as the average estimate over 21 cross-sectional quarterly regressions performed for each group, MEET and NONMEET.

[d]T-tests are reported evaluating the mean difference in absolute value of coefficients.

Table 5
Pooled Regression Results on Observable Analyst Efficiency Using the Single Most Recent Analyst Estimate of Earnings

Regression Model: (Quarters 1996.1 through 2001.1)[a]

$FE_{it} = \alpha_1 UP_{it} + \alpha_2 DN_{it} + \beta_1 Rit*UP_{it} + \beta_2 Rit*DN_{it} + \beta_3 FE_{it-1} + \varepsilon_{it}$

Panel A: Eight-quarter horizon

	MEET	NONMEET	F-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0005	-0.0003	0.47
	(2.71)	(-2.08)	
DN	0.0004	-0.0000	2.72*
	(1.99)	(-0.17)	
R*UP	-0.0000	-0.0000	0.00
	(-0.06)	(-0.03)	
R*DN	-0.0002	0.0077	26.92***
	(-0.21)	(8.02)	
FE_{t-1}	0.5719	0.0679	97.21***
	(11.33)	(8.58)	
		N=5,794	
		Adj. R^2 = 7.93%	

Panel B: Four-quarter horizon

	MEET	NONMEET	F-test $\lvert\beta_{meet}\rvert = \lvert\beta_{nonmeet}\rvert$
UP	0.0007	-0.0008	0.18
	(7.48)	(-6.98)	
DN	0.0006	-0.0005	0.21
	(5.37)	(-4.43)	
R*UP	0.0003	-0.0006	0.18
	(0.95)	(-1.27)	
R*DN	-0.0007	0.0069	84.20***
	(-1.30)	(11.30)	
FE_{t-1}	0.4284	0.0944	427.53***
	(28.06)	(17.85)	
		N=15,616	
		Adj. R^2 = 13.93%	

Table 5, Continued

Panel C: Twelve-quarter horizon

	MEET	NONMEET	F-test $\lvert\beta_{meet}\rvert=\lvert\beta_{nonmeet}\rvert$
UP	0.0005	-0.0008	1.07
	(2.13)	(-4.67)	
DN	0.0005	-0.0009	1.37
	(2.01)	(-4.84)	
R*UP	0.0014	-0.0022	5.47**
	(1.20)	(-2.25)	
R*DN	-0.0009	0.0023	2.77*
	(-0.63)	(1.82)	
FE_{t-1}	0.4219	0.0222	92.70***
	(10.53)	(2.05)	
		N=3,148	
		Adj. R^2 = 19.32%	

Notes:

[a]Variable definitions:

FE_{it}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it}	Return for firm *i* period *t*, measured from two days after the prior quarter's earnings announcement through the day prior to the first forecast used to calculate the consensus earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it}	1 if $R_{it} \geq 0$, 0 otherwise
DN_{it}	1 if $R_{it} < 0$, 0 otherwise.

[b]Firms are categorized by how many times they meet within the most recent eight, four, and twelve quarters, including the current quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient estimates are reported for the regression estimated jointly for the MEET and NONMEET groups.

[d]F-tests are reported comparing the absolute value of the coefficient estimates between MEET and NONMEET groups.

Summary

In general, the results from the estimation of equation 3 appear consistent with the hypotheses. Analysts appear to be relatively less efficient in incorporating the news in returns during the period into their forecasts for firms which do not consistently meet expectations than for firms that are able to do so. This appears especially true for negative returns news; analysts are consistently overly optimistic with respect to the effect of bad news on current period earnings. While both MEET and NONMEET firms analysts appear to underestimate the persistence of forecast errors, this underestimation is greater for firms which are able to consistently meet or exceed expectations over time.

It should be noted that the significance of coefficient estimates on the return variables is somewhat dependent on the method of estimation used. Estimations of quarterly coefficients for each subgroup are performed on many fewer observations each (typically no more than 200), then averaged over twenty-one separate estimates. The joint estimations contain all observations for both subgroups; while this provides more power it also constrains the observable inefficiency to be constant across all quarters. Consequently, the significance of a particular result should be evaluated in view of all the estimations, rather than a particular table.

MARKET INTERPRETATION OF ANALYST FORECAST INEFFICIENCY

Introduction

The prior section investigated differences in analyst forecast efficiency between firms that consistently meet or exceed expectations and those that do not. As mentioned previously, inefficient forecasts contribute to market inefficiencies to the extent that analyst forecasts proxy for, or are naively incorporated into, market expectations. Whether this is the case—whether the market is aware of and corrects for analyst forecast inefficiency—is an empirical question.

Vickers (1999) suggests that market participants are not fooled by an artificial earnings strategy, but the SEC has voiced concerns about the prevalence and cost (to shareholders) of firm strategizing. Public remarks reflect the belief that the market cannot entirely unwind the artificial strategizing action of firms, implying that the stock price rewards given to such firms are unwarranted.[12]

Observable inefficiencies in forecasts imply that forecast errors are predictable. In fact, several of the papers referred to earlier have exploited this predictability in order to illustrate how analysts' forecasts can be improved. Few papers, however, deal with *investors'* abilities to distinguish between the predictable and surprise components of those errors, though several (e.g. Bernard and Thomas [1989]; Lys and Sohn [1990]) have addressed investors' abilities to distinguish between the predictable and surprise components of earnings calculated from a time-series model. Because analysts

[12] Kasznik and McNichols (2002) relate current period meet/beat behavior to the relative performance of earnings in future periods. Results from their study could speak to the impact of an artificial earnings strategy on the market, however their metric of performance is the measure which can be manipulated. To my knowledge, no other study has assessed the relation between MEET status and long-term future performance. I address this again in the final section on future research.

ostensibly have more timely information than a time-series, the market may look more to them for guidance when forming its own expectations. For example, Abarbanell and Bernard (1992) find that analyst inefficiency accounts for a portion of the observed post-earnings announcement drift.

Given the apparent importance of analyst forecasts as a benchmark (Degeorge, Patel, and Zeckhauser [1999]), coupled with managers' varied motivations and the recent importance placed on such motivations by governing authorities, it is important to determine to what extent the market is aware of forecast predictability. If such awareness exists, governing bodies can have more confidence that the market is not necessarily fooled by an earnings strategy based on forecast errors (i.e. that investors do not naively adopt analysts' expectations as their own).

Efficiency and earnings response coefficients

The error term from equation (3) can be interpreted as a proxy for earnings announcement news after controlling for the inefficiencies in analyst forecasts. By comparing a regression of cumulative abnormal returns on aggregate forecast error to one incorporating a distinction between the informative (residual) and predictable components, we may gain insight into the relative importance the market places on each piece of information. If the response coefficients are substantially the same, it suggests that the market cannot effectively distinguish between predictable and surprise components of earnings.[13] On the other hand, if the response coefficient on the efficiency-controlled news component is significantly greater than that on the

[13] To the extent that the entire predictable component of earnings has not been eliminated from the $FE_{it}|EFF_{it}$ measure, however, the power of any comparison will be reduced.

predictable component, the market, at least to some degree, understands that forecast errors are predictable. Similarly, if the market does distinguish between the two components of forecast error, the model fit should improve.[14]

To test this, I perform a cross-sectional event study for a given quarter, regressing the announcement window cumulative abnormal return (CAR) on proxies for news at the earnings announcement date. Equation (4) utilizes residual forecast error after controlling for observable analyst inefficiency.

$$CAR_{it} = \gamma_0 + \gamma_1 FEHAT_{it} + \gamma_2 FE_{it}|EFF_{it} + \eta_{it} \tag{4}$$

where

CAR_{it}	=	cumulative market-adjusted abnormal return measured over the three day window centered on the earnings announcement date,
FE_{it}	=	realized forecast error, defined as actual less forecasted earnings, deflated by beginning of period price,
$FEHAT_{it}$	=	amount of forecast error that is predictable based on observable analyst inefficiency, and
$FE_{it}\|EFF_{it}$	=	residual forecast error after controlling for the observed level of analyst forecast efficiency.

Since $FEHAT_{it}$ is predictable based on observable analyst inefficiency, that portion of total error should not come as a surprise to the market and, consequently, should not be related to the market reaction at the earnings announcement date. If $\gamma_2 > \gamma_1$ it suggests that the market takes analyst inefficiency into account when forming their earnings expectations. If the two coefficients are substantially the same, however, it suggests that the market may not fully understand the predictability in forecast errors stemming from analyst inefficiency.

[14] These tests are similar in spirit to those studies which split total earnings into cash flow and accrual components.

$$H3: \gamma_2 > \gamma_1$$

As in Cornell and Landsman (1989), it is possible that, along with the earnings announcement, managers release information regarding their expectations for the next quarter.[15] In such situations, it is important to control for any market reaction to this new information in order to properly evaluate the reaction to the current earnings announcement. Consequently, I include two control variables related to analysts' period ahead forecast revisions around the earnings announcement date.

The revision variable, REV, is measured as the change in forecasted earnings. That is, REV is equal to PRE_FOR – POST_FOR, where PRE_FOR is the single analyst forecast for period t+2 closest to, and preceding, the earnings announcement date for period t+1, and POST_FOR is the single analyst forecast for period t+2 closest to, and following, the earnings announcement date for period t+1. In order to measure REV for as many firm-quarters as possible, the forecast revision need not occur within the three-day earnings announcement window used to measure $CAR_{i,t+1}$. As a result, the revision window encompasses a greater span of time over which information may enter the market. To control for any information that may be contained in REV but be unrelated to the earnings announcement window, I include a control variable that measures the return over the revision window, exclusive of the return over the three-day announcement period. REVRET is measured as the market-adjusted cumulative return from PRE_FOR through POST_FOR, less the market-adjusted three-day announcement period return. The estimated form of the equation follows:

[15] Recent examples include Home Depot and Dell, both of which gave fourth quarter earnings warnings at the time they announced third quarter earnings for 2002.

$$CAR_{it+1} = \gamma_0 + \gamma_1 FEHAT_{it+1} + \gamma_2 FE_{it+1}|EFF_{it+1} + \gamma_3 REV_{it+2} + \gamma_4 REVRET_{it+1} + \eta_{it+1} \quad (5)$$

Results

Table 6 reports results from the quarterly estimation by subgroup of equation 5. For the four and eight quarter horizons the predictable component of forecast error is not significantly related to the earnings announcement window return, CAR, while the surprise component of forecast error is significantly positive. T-tests of mean difference between these coefficient estimates confirm that the coefficient on the surprise component is significantly greater than the coefficient on the predictable component, consistent with hypothesis 4 and the notion of market efficiency. That is, when reacting to the earnings announcement, the market does not appear to fixate on the entire error; rather, they react to the portion of the error that is not predictable based on observable forecast efficiency. For the twelve quarter horizon, this does not appear to be the case; however further investigation reveals that there are far fewer observations per quarter for this horizon, particularly for the MEET subsample restricting the ability to form consistent coefficient estimates.

Table 6
Quarterly Regression Results on the Market Response to the Predictable and Surprise Components of Analyst Consensus Forecast Error

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$CAR_{it+1} = \gamma_0 + \gamma_1 FEHAT_{it+1} + \gamma_2 FE_{it+1}|EFF_{it+1} + \gamma_3 REV_{it+2} + \gamma_4 REVRET_{it+1} + \eta_{it+1}$

Panel A: Eight quarter horizon

	MEET[b,c]	NONMEET
Intercept	0.008 (3.13)	-0.000 (-0.14)
FEHAT	-1.658 (-0.90)	-0.795 (-0.84)
FE|EFF	4.353 (5.31)	1.142 (3.97)
REV	-2.987 (-3.62)	-0.887 (-3.93)
REVRET	-0.050 (-2.31)	-0.033 (-2.18)
T-test[d] $\gamma_1 = \gamma_2$	3.08^{***}	2.14^{**}

Panel B: Four quarter horizon

	MEET	NONMEET
Intercept	0.008 (4.59)	-0.000 (-0.11)
FEHAT	-0.422 (-0.61)	0.024 (0.03)
FE|EFF	3.012 (7.45)	0.947 (3.77)
REV	-1.984 (-5.13)	-0.660 (-4.51)
REVRET	-0.050 (-4.58)	-0.034 (-3.05)
T-test $\gamma_1 = \gamma_2$	5.06^{***}	1.07

Table 6, Continued

Panel C: Twelve quarter horizon

	MEET	NONMEET
Intercept	0.004 (0.52)	-0.002 (-0.94)
FEHAT	9.554 (0.46)	1.464 (0.72)
FE|EFF	4.238 (1.61)	1.755 (2.77)
REV	-21.009 (-1.21)	-0.975 (-2.33)
REVRET	-0.198 (-1.31)	-0.022 (-1.09)
T-test $\gamma_1 = \gamma_2$	0.13	0.15

Notes:

[a]Variable definitions:

CAR_{it+1}	cumulative market-adjusted abnormal return measured over the three day window centered on the earnings announcement date,
FE_{it+1}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
$FEHAT_{it+!}$	Amount of forecast error that is predictable based on observable analyst inefficiency (fitted value for period t+1 using predicted coefficients from equation 3 estimated at time t), and
$FE_{it+1}\|EFF_{it+1}$	Residual forecast error after controlling for the observed level of analyst forecast efficiency ($FE_{it+1} – FEHAT_{it+1}$).

[b]Firms are categorized by how many times they meet analyst forecast estimates within the most recent eight, four, and twelve quarters, ending the prior quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient are reported as the average estimate over 21 cross-sectional quarterly regressions performed for each group, MEET and NONMEET.

[d]T-tests are reported evaluating the mean difference in value of coefficients.

Turning to Table 7, then, we see the results for the joint estimation of the coefficients for the MEET and NONMEET groups across all quarters. Here, the results are not as consistently clear with respect to market efficiency. At the eight quarter horizon (Panel A), results are generally consistent with those found performing quarterly coefficient estimations by group. The estimated coefficient for the surprise component of forecast error is significantly larger than that for the predictable component of error, though in this case the predictable component for NONMEET firms is significant on it's own. In the four quarter horizon, the surprise coefficient is significantly greater than the predictable one for MEET firms. For NONMEET firms, however, we fail to reject the null that the coefficient estimates are the same, though only the coefficient on the surprise component of error is significantly different from zero. As in Table 6, at the twelve quarter horizon we again fail to reject the null hypothesis that the coefficients on the predictable and surprise components of error are the same for both MEET and NONMEET firms. For MEET firms both coefficients are significant, suggesting that for firms with a longer history of meeting or exceeding expectations the market is less able to distinguish the true surprise within realized forecast errors. An alternative explanation is that for firms with a MEET pattern, the entire current error is an informative signal. For NONMEET firms, neither coefficient is significant, suggesting, perhaps, that for firms without a clear historical pattern, the revision of next quarter's expectations is more informative than the current error itself.

Table 7
Pooled Regression Results on the Market Response to the Predictable and Surprise Components of Analyst Consensus Forecast Error

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$CAR_{it+1} = \gamma_0 + \gamma_1 FEHAT_{it+1} + \gamma_2 FE_{it+1}|EFF_{it+1} + \gamma_3 REV_{it+2} + \gamma_4 REVRET_{it+1} + \eta_{it+1}$

Panel A: Eight quarter horizon

	MEET[b,c]	NONMEET
Intercept	0.005 (4.38)	0.002 (1.64)
FEHAT	0.566 (0.94)	0.559 (3.09)
FE|EFF	1.870 (6.60)	0.903 (8.39)
REV	-1.368 (-5.17)	-0.698 (-6.23)
REVRET	-0.028 (-2.59)	-0.022 (-2.16)
F-test[d] $\gamma_1 = \gamma_2$	5.09^{**}	4.53^{**}
	N=5,820 Adj. R^2 = 3.28%	

Panel B: Four quarter horizon

	MEET	NONMEET
Intercept	0.005 (6.54)	0.001 (0.76)
FEHAT	0.542 (1.76)	0.214 (1.54)
FE|EFF	1.733 (10.77)	0.325 (6.77)
REV	-0.849 (-6.44)	-0.691 (-8.96)
REVRET	-0.028 (-4.72)	-0.026 (-3.85)
F-test $\gamma_1 = \gamma_2$	16.91^{***}	0.58
	N=14,249 Adj. R^2 = 2.54%	

Table 7, Continued

Panel C: Twelve quarter horizon

	MEET	NONMEET
Intercept	0.003	0.000
	(1.72)	(0.58)
FEHAT	4.276	0.019
	(2.17)	(0.07)
FE|EFF	6.177	0.094
	(6.10)	(1.51)
REV	-0.250	-0.699
	(-0.94)	(-4.30)
REVRET	-0.046	-0.010
	(-2.58)	(-0.74)
F-test $\gamma_1 = \gamma_2$	0.99	0.09
	N=2,889	
	Adj. R^2 = 2.24%	

Notes:

[a]Variable definitions:

CAR_{it+1}	cumulative market-adjusted abnormal return measured over the three day window centered on the earnings announcement date,
FE_{it+1}	Forecast error for firm *i* period *t*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
$FEHAT_{it+!}$	Amount of forecast error that is predictable based on observable analyst inefficiency (fitted value for period t+1 using predicted coefficients from equation 3 estimated at time t), and
$FE_{it+1}\|EFF_{it+1}$	Residual forecast error after controlling for the observed level of analyst forecast efficiency ($FE_{it+1} - FEHAT_{it+1}$).

[b]Firms are categorized by how many times they meet analyst forecast estimates within the most recent eight, four, and twelve quarters, ending the prior quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient are reported as the average estimate over 21 cross-sectional quarterly regressions performed for each group, MEET and NONMEET.

[d]F-tests are reported evaluating the difference in value of coefficients.

It is possible, however, that the degree of analyst inefficiency with respect to publicly available information, and hence the estimated coefficients, is not constant from one quarter to another. Since analysis of the results from estimating equation 3 suggest that analysts are, at least in some cases, inefficient with respect to certain information, I also estimate a regression of CAR on *total* current period forecast error, as well as the information variables from equation 3. Since the prior analysis suggests that the total forecast error is related to these information variables, including them in a regression of CAR on forecast error should control for the noise in forecast error without restricting the coefficient estimates to be the same from quarter to quarter. If the market considers analyst inefficiency in setting their expectations, the pattern of significance on the coefficient estimates of this expanded regression should mirror that of the earlier analysis, though the magnitudes may change.

Tables 8 and 9 contains this analysis, quarterly and joint respectively, for each horizon. The results are not generally consistent with the market controlling for variables for which analysts are observably inefficient in the prior period. That is, at the earnings announcement date the market appears to primarily react to current period error, generally controlling only for the prior period error. The market does not appear to control for returns-based information, though prior analysis shows that, in some cases, analysts are observably inefficient with respect to this information when forming their forecasts. The possible exception is the twelve quarter horizon. Again, the number of observations within a quarter are much smaller for this horizon for the MEET subsample, restricting our ability to estimate stable coefficients across quarters. For the joint estimation, however, the market does appear to control for publicly available bad news when evaluating current period error.

Summary

The evidence is mixed regarding whether the market appropriately controls for analyst inefficiency. Though earlier analysis indicates analysts are to some degree inefficient with respect to both period returns and prior period errors, the market response to current period forecast error does not appear to reliably distinguish between the resulting predictable and surprise components of earnings. There is some evidence, however, that they are able to make this distinction when the pattern of forecast errors, or lack thereof, is less established.

Table 8
Quarterly Estimation of Market Response to Analyst Consensus Forecast Error Controlling for Prior Information

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$CAR_{it+1} = \alpha_1 UP_{it+1} + \alpha_2 DN_{it+1} + \beta_1 FE_{it+1} + \beta_2 Rit{*}UP_{it+1} + \beta_3 Rit{*}DN_{it+1} + \beta_4 FE_{it} + \gamma_3 REV_{it+2} + \gamma_4 REVRET_{it+1} + \varepsilon_{it}$

Panel A: Eight quarter horizon

	MEET[b,c]	NONMEET
UP	0.006 (1.72)*	0.004 (1.03)
DN	0.005 (1.33)	0.002 (0.75)
FE_{t+1}	4.495 (4.56)***	1.167 (3.75)***
R*UP	0.004 (0.18)	-0.030 (-1.01)
R*DN	-0.019 (-0.55)	-0.021 (-0.68)
FE_t	-2.793 (-2.29)***	-0.269 (-1.57)
REV	-2.824 (-3.83)***	-0.970 (-4.31)***
REVRET	-0.059 (-2.47)**	-0.034 (-2.40)**

Panel B: Four quarter horizon

	MEET	NONMEET
UP	0.005 (2.44)**	0.003 (1.24)
DN	0.007 (2.57)**	0.002 (0.63)
FE_{t+1}	2.818 (7.70)***	0.902 (3.67)***
R*UP	0.001 (0.16)	-0.015 (-0.76)
R*DN	-0.006 (-0.28)	0.030 (1.46)
FE_t	-1.618 (-4.02)***	-0.650 (-4.24)***
REV	-2.217 (-5.38)***	-0.650 (-4.24)***
REVRET	-0.054 (-5.03)***	-0.038 (-3.81)***

Table 8, Continued

Panel C: Twelve quarter horizon

	MEET	NONMEET
UP	-0.129	0.000
	(0.95)	(0.18)
DN	0.011	-0.010
	(0.97)	(-1.34)
FE_{t+1}	61.827	2.598
	(1.02)	(3.25)***
R*UP	0.732	-0.028
	(1.07)	(-0.68)
R*DN	0.193	-0.169
	(0.68)	(-1.59)
FE_t	164.93	-0.075
	(0.97)	(-0.15)
REV	110.217	-1.458
	(0.97)	(-2.26)**
REVRET	-0.043	-0.059
	(-1.76)*	(-1.27)

Notes:

[a]Variable definitions:

FE_{it+1}	Forecast error for firm *i* period *t+1*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it+1}	Return for firm *i* period *t+1*, measured from two days after the prior quarter's earnings announcement through the day prior to the earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it+1}	1 if $R_{it} \geq 0$, 0 otherwise
DN_{it+1}	1 if $R_{it} < 0$, 0 otherwise.
CAR_{it+1}	cumulative market-adjusted abnormal return measured over the three day window centered on the earnings announcement date,

[b]Firms are categorized by how many times they meet analyst forecast estimates within the most recent eight, four, and twelve quarters, ending the prior quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient are reported as the average estimate over 21 cross-sectional quarterly regressions performed for each group, MEET and NONMEET.

Table 9
Pooled Estimation of Market Response to Analyst Consensus Forecast Error Controlling for Prior Information

Regression Model: (Quarters 1996.1 through 2001.1)[a]
$CAR_{it+1} = \alpha_1 UP_{it+1} + \alpha_2 DN_{it+1} + \beta_1 FE_{it+1} + \beta_2 Rit{*}UP_{it+1} + \beta_3 Rit{*}DN_{it+1} + \beta_4 FE_{it} + \gamma_3 REV_{it+2} + \gamma_4 REVRET_{it+1} + \varepsilon_{it}$

Panel A: Eight quarter horizon

	MEET[b,c]	NONMEET
UP	0.005 (2.53)**	0.004 (1.71)*
DN	0.005 (1.97)*	0.003 (1.20)
FE_{t+1}	1.901 (6.62)***	0.914 (8.42)***
R*UP	-0.000 (-0.01)	-0.027 (-1.92)*
R*DN	-0.005 (-0.28)	0.000 (0.05)
FE_t	-0.976 (-2.31)**	-0.123 (-1.77)*
REV	-1.374 (-5.16)***	-0.633 (-5.73)***
REVRET	-0.026 (-2.38)**	-0.019 (-1.82)*

N=5,819
Adj. R^2 = 3.18%

Panel B: Four quarter horizon

	MEET	NONMEET
UP	0.005 (3.65)***	0.002 (1.27)
DN	0.004 (2.79)***	0.003 (1.38)
FE_{t+1}	1.738 (10.84)***	0.310 (6.63)***
R*UP	-0.004 (-0.56)	-0.007 (-0.75)
R*DN	-0.010 (-1.03)	0.019 (1.59)
FE_t	-0.729 (-4.25)***	-0.009 (-0.17)
REV	-0.835 (-6.29)***	-0.666 (-8.73)***
REVRET	-0.031 (-5.19)***	-0.025 (-3.69)***

N=14,243
Adj. R^2 = 2.53%

Table 9, Continued

Panel C: Twelve quarter horizon

	MEET	NONMEET
UP	0.006	0.000
	(1.74)*	(0.35)
DN	-0.003	0.004
	(-0.89)	(1.23)
FE_{t+1}	5.629	0.084
	(5.31)***	(1.33)
R*UP	-0.018	0.009
	(-0.77)	(0.59)
R*DN	-0.073	0.039
	(-2.60)***	(1.78)*
FE_t	-2.358	-0.097
	(-1.77)*	(-1.25)
REV	-0.218	-0.687
	(-0.82)	(-4.53)***
REVRET	-0.047	-0.013
	(-2.60)***	(-0.95)
	N=2,887	
	Adj. R^2 = 2.17%	

Notes:

[a]Variable definitions:

FE_{it+1}	Forecast error for firm *i* period *t+1*, defined as actual less forecasted earnings per share, deflated by beginning of period price. The earnings forecast is calculated as the median of the most recent forecast for each analyst, available within the sixty-day period prior to the earnings announcement.
R_{it+1}	Return for firm *i* period *t+1*, measured from two days after the prior quarter's earnings announcement through the day prior to the earnings forecast, less the CRSP value-weighted market portfolio return.
UP_{it+1}	1 if $R_{it} \geq 0$, 0 otherwise
DN_{it+1}	1 if $R_{it} < 0$, 0 otherwise.
CAR_{it+1}	cumulative market-adjusted abnormal return measured over the three day window centered on the earnings announcement date,

[b]Firms are categorized by how many times they meet analyst forecast estimates within the most recent eight, four, and twelve quarters, ending the prior quarter. NONMEET firms meet or exceed forecasts in no more than half of the quarters. MEET firms meet or exceed forecasts in each of the quarters.

[c] Coefficient are reported as the average estimate over 21 cross-sectional quarterly regressions performed for each group, MEET and NONMEET.

SUMMARY AND CONCLUSIONS

In this dissertation, I first test whether analyst forecast errors are significantly related to information that is publicly available at the time the forecasts are made. Evidence suggests that analysts are relatively less efficient at incorporating news, especially bad news, into their earnings forecasts for those firms which do not consistently meet or exceed expectations (i.e. those firms who meet or exceed expectations in half or fewer of the quarters within a historical horizon window). At the same time, forecast errors are significantly more persistent for firms with a historical pattern of meeting or exceeding expectations. It is not clear whether the market distinguishes between the resulting predictable and surprise components of realized forecast errors. While market participants may do so successfully when a pattern of forecast errors is less established, "seeing through" the forecast error may become more difficult over time. An alternative explanation, however, is the possibility that the nature of the information in current period forecast errors changes as firms are more clearly established as MEET or NONMEET firms.

Given the above possibility that the market may not "correctly" control for analyst inefficiency when setting its expectations of earnings, an extension of the current work could examine whether an investor could earn abnormal returns by formulating a trading strategy based on the true surprise contained in realized forecast error.

Kasznik and McNichols (2002) are the first to question whether, "artificial" strategy or not, the rewards observed to meeting expectations are rational. That is, do MEET firms have better future performance? Indeed, evidence in Chevis, Das, and

Sivaramakrishnan (2002a) suggests that the market perceives MEET firms to have better future growth opportunities. If a MEET strategy is a costly and credible signal of future performance, perhaps it is not as bad as it is portrayed, even if "accounting devices" such as earnings and expectations management are used to achieve it. The future performance metric Kasznik and McNichols (2002) use, however, is earnings, the very item that may be manipulated in order to achieve the strategy. A contemporaneous study proposes the use of a variety of metrics to evaluate the long-run future performance of MEET firms, including abnormal returns, the P/E ratio, asset growth, cash flows, and the B/M ratio. Such tests will further our understanding of the validity of the signal management is likely trying to convey by following a meet/beat strategy.

The results in Bonner, Walther, and Young (2001) suggest that the relative level of investor sophistication could play an important role in the analyses outlined in the preceding sections. It is possible that sophisticated investors are more adept at analyzing and correcting for analyst forecast inefficiencies. An extension of the current study could include a proxy for investor sophistication as an additional control variable.

Finally, this scenario is replayed in many markets around the world. Those markets, however, have different properties from the one in the United States. Analysts have an "information revelation" role here but may perform another function in a different economic setting. The U.S. could benefit from learning whether those markets have a better ability to "see through" managerial manipulations in these other contexts. Chevis (2002) is a first step in that direction.

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Characteristics of firms that consistently meet or exceed analysts' earnings forecasts with S. Das and K. Sivaramakrishnan, December 2002

An international perspective on analyst forecast errors using hierarchical linear modeling, January 2003